A general overview of the SI model is provided, including the SI philosophy, essential components of the program, program structures, key roles, outcomes, and evaluation. A review of what we have learned about the importance of planning SI sessions, providing ongoing training for leaders, conducting regular SI program assessments, and implementing effective and essential learning strategies is also provided.

The Basic SI Model

Maureen Hurley, Glen Jacobs, Melinda Gilbert

Supplemental Instruction (SI) was developed by Dr. Deanna Martin in 1973 at the University of Missouri at Kansas City (UMKC) to increase the performance and retention of students in high-risk classes. SI is an academic support program that provides regularly scheduled, out-of-class, peer-facilitated sessions that are open to all students in the course. The students attend the sessions on a voluntary basis. SI leaders—the facilitators—are students who have demonstrated competence in this or a comparable course and have taken part in an intensive two-day training session. The SI leaders attend all class sessions, take notes, read all assigned material, and conduct three or more fifty-minute SI sessions each week. They guide students in learning appropriate study strategies, such as note taking, graphic organization, questioning techniques, vocabulary acquisition, and test preparation, while also reviewing content material. The program also has an SI supervisor. The SI supervisor identifies the targeted courses, is responsible for gaining faculty support, selects and trains SI leaders, monitors SI sessions for quality, and evaluates the program (University of Missouri-Kansas City, 2005).

Philosophy of the Model

The philosophy behind the SI model is based on a collection of learning theories. SI borrows several behavioral learning principles from Skinner (Epstein, 1982), Bandura (1977), Ausubel (1967), and Herbart (1895). The first behavioral learning principle is that behavior is based on positive reinforcement. When students learn a new study strategy that helps them do
well on a test, they will continue to use that strategy. Second, it is important to break down complex tasks into their component parts. When a student does not understand a complex task the SI leader teaches the student how to break it down into smaller parts. Working on a task piece by piece can be less overwhelming and can help a student better understand a concept as he or she goes along. Third, it is important to emphasize cause-and-effect relationships: good study strategies result in good performances. Finally, modeling is important. SI leaders need to model good study strategies for their students.

SI also borrows several cognitive developmental principles from Bruner (1968), Piaget (1932/1973), and Flower and Hayes (1981). First, cognitive structures develop little by little as learning is built through organization and assimilation of new information and experiences. If the SI leader can help students learn how to organize and integrate new information and experiences, then the students will be able to absorb and actually store the information for future retrieval. Second, learners think differently about a concept as they assimilate knowledge. SI leaders help students learn how to think critically about a concept. Third, prior knowledge is used while learning new knowledge. SI leaders help students learn how to relate their prior knowledge to new concepts for better understanding and absorption of information. Finally, cognitive development is stimulated when conflict arises during social interaction. SI leaders encourage students to discuss topics with peers outside of the classroom. When students find that there is a conflict in their information, resolving the conflict causes them to expand their cognitive development.

SI also borrows some social interdependence principles from Geertz (1983), Vygotsky (1986), Bakhtin (1993), Doyle (1983), and Erickson (1982). First, learners actively build knowledge. Students have to take responsibility for their own learning by voluntarily attending SI sessions. Second, it is important to work together cooperatively and interdependently. Students in SI learn to work together to reach common goals. When students work together, everyone's individual knowledge contributes to the task at hand and the students benefit from everyone in the group. Third, knowledge is more thorough when it is produced, not simply distributed. Thus, SI leaders do not lecture the students; instead, they guide students in different study strategies that they can employ on their own. Fourth, knowledge and understanding are constructed in dialogue with others and facts are “true” in that social situation. As mentioned earlier, the students learn from each other. Fifth, learners are able to do in group effort today what they will be able to do autonomously tomorrow. The knowledge students gain in SI can be used in other classes and in different settings in the future.

Finally, SI borrows several interpretive-critical principles from Freire (1988), Apple (1988), and Kozol (1995). First, learners take control of their own learning processes when empowered by good pedagogy, and second, education’s goal should be liberation rather than domination. Therefore, SI leaders work to get students to a point where they do not have to rely on their professors for answers. Third, a motivation for educational programs
should be to overcome the learner's "culture of silence." A student who does not understand a concept may stay quiet because he is afraid he is the only one who does not understand. SI works to help students break their silence and realize that if they are struggling, then others may also be struggling.

### Why and How It Works

SI works because SI sessions are proactive and participatory rather than reactive and passive. SI strives to break what is called the dependency cycle or learned helplessness. The dependency cycle is a pattern of learned behavior that allows students to remain dependent on an authority figure (the instructor or tutor) for learning. Relying too heavily on repetition, drill, and memorization encourages this dependency. These techniques cause students to fall back into a mode of memorizing isolated facts that is time-consuming and ineffective. Students with sophisticated learning strategies that allow them to convert information into meaningful knowledge will learn with this format; however, students without this sophistication, especially those new to a discipline, will have problems. When these students have problems, they will ask questions, which may lead to their professor telling them the same information again, usually more slowly the second or third time. Repeating the same information more slowly does not correct the problem. The students' failure in one situation may lead them to believe that they cannot learn new complicated information at all. SI works to help students use new learning strategies so they are less dependent on being told information. It enjoys a nonremedial image while offering academic support to all students enrolled in historically difficult courses (University of Missouri-Kansas City, 2005).

SI also works because, besides allowing students to get higher grades and gain effective learning skills, it provides them with peer collaborative learning experiences that promote assimilation into campus culture. SI makes efficient use of study time and provides an opportunity for students to develop relationships with other students and staff, an important factor in retention (University of Missouri-Kansas City, 2005).

### Program Structure

There are a number of important decisions to be considered when organizing and maintaining an SI program.

**Key People and Roles.** There are four key participants in the SI program: the SI leader, the SI supervisor, the student, and the faculty member. Each person plays a key role. The SI leader attends training before classes start, attends the targeted class, takes notes, does homework, and reads assigned materials. Leaders conduct at least three to five SI sessions each week, choose and employ appropriate session strategies, support faculty, meet with their SI supervisor regularly, and assist their SI supervisor in training other SI leaders (University of Missouri-Kansas City, 2005).
The SI supervisor assists SI leaders in doing their job. Supervisors provide on-site supervision of the SI program, assist SI leaders with attendance, surveys, scheduling, and faculty relations, and promote the program. SI supervisors also identify weaknesses or problems in the current SI program and solve or make recommendations for their solution (University of Missouri-Kansas City, 2005).

Students voluntarily attend SI sessions for targeted classes and participate in sessions as much as wanted or needed. Faculty make grades from exams available to the SI supervisors to help them determine whether students coming to SI are performing at a higher level than those students who do not. Faculty allow SI leaders to attend class, give them a few minutes at the beginning of class to make announcements about the program, meet with SI leaders on a regular basis during office hours, and share reactions to the SI program (University of Missouri-Kansas City, 2005).

**How Classes Are Chosen.** SI targets classes that consistently demonstrate 30 percent or higher rates of D's, F's, and withdrawals (DFW's). These classes must also have the instructor's support and be large enough to adequately support SI. The instructor is usually demanding but fair, and SI is assigned to a course because of what is being taught, not because of the manner in which it is being taught. SI does not focus on the student or the professor; it focuses on the difficult course material (University of Missouri-Kansas City, 2005).

**Marketing SI.** When SI sessions are marketed it ensures that students are constantly reminded of them. There are several ways that SI can be marketed. SI leaders can announce the program during the first class of the semester. This is a good time for an awareness video to be shown that explains and promotes SI. SI bookmarks and stickers can be made and handed out to the students. SI leaders can put information up on an overhead projection before class begins so that students can see it as they walk in. Such an overhead might include an exam score analysis chart showing SI versus non-SI mean grades and advertise concepts that will be covered in the following weeks' sessions as well as note all of the session times, days, and locations. SI leaders can also write the daily SI times and locations on the board during each class (University of Missouri-Kansas City, 2004).

It is also helpful to promote the SI program through academic advising, new student orientation programs, and other means before the academic term begins.

**Outcomes of SI.** Studies show the benefit of attending SI sessions. SI is proven to increase mean final course grades for students at all ability levels, regardless of prior achievement. A study showing the grades of students from the fall of 1997 to the fall of 2003 showed a significant difference between those who attended SI sessions and those who did not. Attendees had lower percentages of DFW's than those who did not attend. The skills learned for the class that provides SI can also be carried over to other classes (University of Missouri-Kansas City, 2005).
Furthermore, students are not the only ones who benefit from the program. SI leaders benefit by learning material better for their own discipline, learning effective study skills, and learning how to talk about what they know. They also benefit by gaining leadership skills that are positive additions to a resume. Administrators benefit by the increased retention rates produced by the program. And finally, faculty benefit by gaining more time for research since students stop by their office less often because they no longer see faculty as their main source of information (University of Missouri-Kansas City, 2005).

**Program Evaluation and Reporting.** It is important for SI to be evaluated regularly. The evaluation should be completed at the end of each term after final exams and final grades have been determined. The SI program is evaluated each academic term in order to continuously improve the overall quality of the program. Information about its strengths and weaknesses is gathered to inform college administrators about its overall impact. The program is evaluated by assessing institutional outcome measures such as final course grades, course withdrawal rates, institutional dropout rates, and institutional graduation rates (University of Missouri-Kansas City, 2005).

In addition to revealing the program's strengths and weaknesses and assessing its impact, evaluations help faculty and administrators know how many students the program serves and whether or not students say it is beneficial to them. They also keep the program on the faculty's and administrators' minds. Assessment is important too because it can have a direct link to funding (University of Missouri-Kansas City, 2005).

**What We Have Learned: What Worked? What Did Not Work?**

We have learned a number of things in our thirty-plus years of providing SI on our own campus as well as from feedback in the field. Lessons learned are in several key areas: (1) the roles of the faculty, supervisor, and leader; (2) session planning; (3) the importance and structure of ongoing training; (4) SI program assessment; and (5) effective and essential learning strategies. Some of these topics were already touched on but will now be discussed in greater detail.

**Roles of the Faculty, Supervisor, and Leader.** The faculty's role in the SI process has become more and more critical as we look at a team approach to producing the most positive outcomes for participants. Faculty must be supportive of the SI model and understand how the peer-led sessions can help students learn more effectively. They can help coach the leaders in the course content that is most critical for students to understand. When they are available to meet weekly with the leaders, they can help guide the structure of the SI sessions. This also allows them to receive feedback on what is particularly challenging for the students.

Faculty must also visit with the SI supervisor before the term begins to discuss what their role entails. Their lectures cover a good deal of content, but often they do not have time to help students grapple with the nuances
of the key elements and important concepts. When faculty are enthusiastic about SI and encourage their students to take advantage of it, they play an important role in motivating them to participate in the sessions. Faculty on our campus and at other institutions say that telling students that SI is a continuation of the class results in greater SI attendance. If leaders are having difficulties with attendance they can ask the professor to share the benefits of SI with the students. It is critical that faculty do not say that SI is for students who are struggling, because once they perceive it as remedial, they will not come to sessions.

We also ask faculty to send the first exam grades to the SI supervisor. This way the data can be analyzed and the mean grade for SI and non-SI participants can be calculated. This can provide a strong incentive for students, who learn that SI participants do better than their nonparticipating counterparts.

The supervisor's responsibilities are quite time-intensive. Supervisors need to interact with administrators to show the value of the program in terms of numbers of students served, cost-effectiveness, course completion, reenrollment and graduation rates, higher course grades, and lower DFW rates. National data are available on studies that show outcomes supporting these elements. Administrators are aware of the cost of recruiting new students versus retaining current ones. Because SI is a group learning model, more students are served in SI sessions than in individual tutoring sessions.

After getting the administrators onboard, it is the supervisor's responsibility to contact deans, department chairs, and individual faculty to discuss the value of attaching SI to selected courses. Supervisors need to look for faculty who are open and receptive to interventions that will help their students learn more effectively.

In starting a program, it is essential to select senior faculty who are well respected by their peers and well liked by students. The supervisor can ask them to recommend a few students who have taken their course and would be good leaders. Next, the supervisor interviews prospective leaders and makes a selection, choosing students who are likely to have a good rapport with program participants and have the time to carry out the duties.

The supervisor and other staff are responsible for booking rooms, producing surveys, organizing training, securing funds for salaries and other expenses, conducting evaluations, keeping in touch with faculty, assisting leaders with planning, observing and debriefing SI sessions, and producing reports. Sufficient release time for supervisors is critical for the quality and success of the program.

Finally, leaders too are essential members of the SI team. Their time commitment is considerable; it includes attending classes, planning sessions, conducting sessions, and meeting with faculty and supervisors. Their training before the term and during the semester should focus on effective learning strategies for their course. They need to set up their sessions in such a way that the students are actively engaged with the material, work with one another, and take away a clear understanding of the content. It is
important that leaders be open to suggestions and focus on their students' needs. They do not "re-lecture" but instead provide activities that allow students to think critically, teach one another the material, and learn effective strategies that work for deeper understanding and test preparation. They must provide a dynamic session that will capture the students' attention and make them feel this was a worthwhile use of their time.

**Planning the SI Session.** There should be a well thought-out written plan for each session. Planning sheets should be used, and must contain session objectives, content to be covered, and processes to be used. Leaders work with both the supervisor and the faculty member to assist them in creating their session plan. The plan is based on the key concepts that were covered in the weekly classes. The objective should state clearly what needs to be accomplished in the session based on those critical elements. Estimated time for each activity should be listed so that the leaders can use the planning sheet as a guide to help stay on task.

Each session should begin by setting the agenda, go on to provide group work that employs one or two learning strategies, and finally provide a closing activity. During the session the leaders need to briefly describe the content to be covered and the learning strategies to be used to accomplish the objectives. It is important for students to feel that their voice is heard and that they have learned something valuable, and it is important for them to be comfortable enough to ask questions and work with other students. Leaders can also be available during office hours to meet with students individually.

As noted earlier, the first day of class is a good time for leaders to talk with the students about SI. Their presentation should be planned and delivered in a way that motivates students to attend. By being present in class each day and taking notes, the leaders can show their interest and involvement in the course. They need to be approachable, talk with students, and encourage them to participate in SI.

**Ongoing Training for Leaders.** We have found that as important as initial training for leaders is, holding regularly scheduled training meetings throughout the term is even more essential. The focus of these sessions is on both the process and the methodology most closely aligned to course content (University of Missouri-Kansas City, 2005). The International Center for SI recommends that supervisors hold biweekly meetings with leaders to give them regular feedback that can shape their continual session planning. The leaders share their concerns about how their sessions are going and the group, with the supervisor's guidance, problem-solve and determine how the difficult concepts from the lectures can best be approached.

Some training meetings can be led by the leaders. We recommend that leaders in similar content areas design a session plan and present it to the larger group for critique and discussion. Leaders can share the specifics of a plan they used and tell the group what worked well and what did not.
New leaders may feel particularly insecure or lost at the beginning of the term. Veteran leaders can give them valuable advice on how they planned and conducted sessions, what learning strategies worked especially well for them, and how they dealt with difficult issues that arose during the sessions.

Just as the SI model is based on the tenets of collaborative learning, the ongoing training meetings should employ those same kinds of strategies. Some activities can be done with partners or in small or large group discussions. It is always important to allow for report-back from the groups so that the leaders have a chance to explain what they did and how they processed a learning strategy. We have found that without these frequent meetings, leaders may revert to re-lecturing, answering their students' questions, or relying on the same strategies in every session. This can have a negative impact both on the learning that takes place and on attendance.

**SI Program Assessment.** As already noted, after the first exam faculty are asked for a list of student grades so that they can compare results of SI and non-SI participants. The mean grade of SI attendees should generally be in the range of one-half to a full letter grade higher than non-SI attendees. Having the leader share this information with the class can motivate all students to attend SI sessions.

Next, an evaluation should be completed at the end of the term after final grades are posted. This assessment is needed to compare final course grades and the percentage of DFWs among SI and non-SI attendees. These outcomes help determine the success of the program and give administrators a reason to continue financing it (University of Missouri-Kansas City, 2005).

The program assessment should measure both learning and retention. Lowering the rate of DFWs results in a higher percentage of students completing the course. Studies at UMKC have shown that it also contributes to higher reenrollment and graduation rates.

Administrators want to know the overall success of the program in terms of number of students served, academic progress of students, and cost-effectiveness. Faculty are interested in how students did in their course, who attended SI, and how satisfied students are with the program. It is critical to regularly send reports to faculty and administrators that contain data outcomes as well as narratives on program results. These reports remind them that the program is serving a number of students and contributing to their academic success.

**Effective and Essential Learning Strategies.** Learning strategies are at the core of SI. In developing SI, Dr. Deanna Martin based the model on the results of leading research. She placed it in the conceptual framework of Piaget's model of cognitive development (Blanc, DeBuhr, and Martin, 1983). Martin's theory considered that many university students arrive with a deficiency in abstract reasoning and the critical thinking skills they need to process information from a lecture. These students may also be unable to read effectively and comprehend key concepts in a textbook (Hurley, 2000). Martin also believed in constructivism, the idea that learning happens best.
when students construct their own knowledge. SI includes the active engagement of students in the learning process. This is achieved by following specific processing guidelines.

Students who study together learn more by teaching each other (Johnson, Maryuyama, Johnson, Nelson, and Skon, 1981). In the SI sessions it is important for the leader to employ proven learning strategies that allow students to work together (University of Missouri-Kansas City, 2004). It is important to vary the strategies so that students do not become bored. Some techniques are applicable to learning content in any course; other strategies work more effectively in problem-based classes, such as science and math, or in information-based classes, such as history or philosophy.

"Redirecting questions" is a strategy that is central to all types of SI sessions. The goal of this process is to provide a structure in which students interact with one another rather than direct all of their comments and questions to the leader. This may sound like a simple technique, but it is surprisingly difficult for some leaders to master. It is based on the idea that we learn more effectively if we explain something to someone else (Riley, 1981). It is counterintuitive for leaders not to answer a question asked by a student when they are knowledgeable about that content. Therefore, the SI supervisor needs to provide leaders opportunities to practice this strategy during the training meetings. It is helpful if the supervisor models the process and then has the leaders practice the redirecting in pairs, followed by demonstrations for the large group. Examples of this technique can be found in the Supplemental Instruction Leader Resource Manual (University of Missouri-Kansas City, 2004).

Using “wait time” is another essential strategy. Wait time is the time that elapses between an SI leader question and a student response (University of Missouri-Kansas City, 2004). It is important to distinguish between the wait time that occurs after the leader asks a question and the wait time that occurs after a student first responds. Wait time is the key to conducting any SI session. The literature on learning suggests that there is a correlation between the level and depth of student responses and the use of at least three seconds of wait time before the person asking the question says anything else (Rowe, 1974). Students need time to think critically and formulate a meaningful answer.

The second wait time, after a student responds to a question, seems to have an even greater impact on the quality of the response because it allows students to organize information, which results in a deeper processing and engagement in formulating their thoughts. More students tend to join the discussion when this kind of wait time occurs. Again, leaders need to practice this strategy so that it becomes natural for them to use it in SI sessions. They will find that the quality of student responses will improve if they use this technique.

Of course, checking for understanding is essential. If the leader simply asks the students if they have any questions or if they had trouble understanding a difficult concept, they may just say no. But the leader should not
assume that this response is accurate. Therefore, the leader needs to devise a strategy that engages the students in demonstrating what they know and how they know it. The leader can ask open-ended questions that require students to explain in their own words that they understand a difficult concept before the leader moves on to the next topic. The leader may ask students to summarize the concept that was just covered, write the main points or steps to a problem on the board, give an application of the concept, or write about or demonstrate a similar problem (University of Missouri-Kansas City, 2004).

**Problem-Solving SI Strategies.** Courses such as math, chemistry, and physics may present significant challenges for students. They may not know where to start in solving a problem, or it may have been many years since they last took this kind of course. Faculty may not have the time or opportunity to address effective problem-solving strategies in class. Therefore, SI can provide an environment in which students can grapple with difficult problems and work together to improve their skills. SI offers the benefit of collective thinking and problem solving. Students can share what they know, ask the leader for input if needed, and collaboratively come up with the sequence of steps and usage of formulas to arrive at the correct answer to a problem.

Boardwork is essential in processing the steps and arriving at a solution. Student pairs can write on small whiteboards to work through a problem and then demonstrate the problem for the whole group. It is essential to include enough time for the student teams to present how they thought about the problem, the steps involved, and how they arrived at the solution. The *Supplemental Instruction Leader Resource Manual* (University of Missouri-Kansas City, 2004) contains a boardwork model that clearly illustrates the techniques described here.

SI strategies for understanding course content in the humanities and social sciences differ from problem-solving techniques (University of Missouri-Kansas City, 2004). An effective strategy to employ here is to analyze the complexity of a concept or the link between various theories or thought processes. While verbalizing or writing may be the common currency in a humanities presentation, organizing vast amounts of material may be more important in a social sciences course. The leader thus needs to structure the SI session plan so that students engage with the material in the way that the professor wants them to. The SI leader has usually taken the professor’s course and mastered the strategies that work effectively. It is a good idea for leaders to share how they think about a concept. This modeling can help students apply critical thinking and analysis for themselves.

Organizing information from both the lectures and textbooks is key to mastering content in social science courses such as history. Providing handouts such as matrices or other visual models and having students use them to think about and process information with a partner or in a small group forces them to use their notes, discuss key elements, and demon-
strate an organizational pattern that clearly illustrates their understanding of the content.

**Conclusion**

SI gives students a chance to continue the learning that begins in the classroom and take ample time to struggle with concepts and ideas, work through difficult material, develop effective thinking and processing strategies, and benefit from the synergy of a group working together to solve problems and more effectively engage with difficult material. This model, which has been used for more than thirty years, still yields strong results in student learning, higher final course grades, and lower DFW rates across disciplines, types of colleges, and student ethnicities. In 1981, the U.S. Department of Education designated SI as a model postsecondary retention program and advocated its dissemination throughout the United States (Blanc, DeBuhr, and Martin, 1983). It is a viable retention program that continues to be used as a solid intervention in colleges and universities around the world.

**References**


**MAUREEN HURLEY** is associate director of and a certified SI trainer for the Center for Academic Development and the International Center for Supplemental Instruction at the University of Missouri-Kansas City.

**GLEN JACOBS** is director of and a certified SI trainer for the Center for Academic Development and the International Center for Supplemental Instruction at the University of Missouri-Kansas City.

**MELINDA GILBERT** is a student in the master’s program in counseling and guidance and a graduate intern at the Center for Academic Development and the International Center for Supplemental Instruction at the University of Missouri-Kansas City.